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ABSTRACT

A study examined how the "Reading Classroom Explorer" (RCE, a hypermedia learning environment) might enhance the learning of preservice teacher education students as they prepare to assume internships. RCE is a searchable database of digitized video clips from the Center for the Study of Reading's video series "Exemplary Ways To Teach Reading." Subjects were 13 post-baccalaureate students in a teacher education methods course. Subjects used RCE as one source from a host of possible sources they were encouraged to draw upon in the course. Three paper assignments were central to the course, comparing the use of whole language and skills orientations to teaching reading, management and use of different grouping arrangements, and the awareness and impact of diverse learners on teaching and learning. Data included the paper assignments, interviews, videotaped work sessions, and several surveys that provided information about students' technology and professional backgrounds and their reactions to the hypermedia. Results indicated that preservice teachers used the cases in RCE as an information resource, much like the books they read, lectures they heard in courses, or observations they made. Further research will explore the extent to which teachers who use RCE impact the teaching culture within which they work, and whether RCE benefits users most when used collaboratively toward a course goal. Contains eight references and six tables of data; appendixes contain the classification scheme. (RS)

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The Role of Hypermedia in a Preservice Education Course

RUNNING HEAD: Hypermedia in Preservice Education

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Introduction

We developed *The Reading Classroom Explorer* (RCE), a hypermedia learning environment, for use in teacher education. RCE is based on the Center for the Study of Reading's video series, "Exemplary Ways to Teach Reading." The video footage includes exemplary teachers teaching reading to culturally, socio-economically, intellectually, and geographically diverse students. Classroom locations include: Honolulu, HI; Harlem, NY; Danville, IL; San Antonio, TX; Lansing, MI; Media, PA. RCE is a searchable (by school, broad theme, and/or keywords) database of digitized video clips from the video series. Users are able to watch video, read transcripts, read questions based on content, and make notes in an interactive notebook. In an earlier study (Authors, in Press), we explored participants' views of RCE as a learning environment. This inquiry indicated participants held diverse views about RCE's purpose as a learning environment and discovered an interesting, if wide-ranging, set of approaches for navigating our hypermedia environment. Intrigued and encouraged by our preliminary research, we began investigating, in Spring, 1997, the integrated and complementary use of RCE in a semester-long methods course; specifically, we wanted to know how RCE might enhance the learning of pre-service teacher education students as they prepare to assume internships.

Because RCE is derived from an existing "set" of instructional materials, completely edited with visuals and voice-overs, there is a tendency to think of it as a "pre-packaged" set of cases. And in one sense it is. The cases meet Shulman's standard of constituting "concrete human images of activities and values worthy of emulation" (Schulman, p. 8, 1992) and may even "induce change in the direction of the exemplar" (Bird & Sykes, p. 494, 1992).Unfortunately, as Bird & Sykes (1992) indicate, often we are relegated to solely using video and narrative cases as examples to support reform-oriented methods instruction. Bird & Sykes explain:

> Most obviously, if teacher educators hold transformative aims and seek to promote new instructional practices and social ideas that are not widely available for observation in schools, then cases might constitute one bridge between hortatory pronouncements and new practices and attitudes. Video cases, in particular, may have value in presenting vivid, concrete images of desirable instructional practices that may help change the minds of prospective teachers. (p. 494)

However, there is a danger when few cases are used, for students to understand case content more as a prescriptive, rather than an exemplary, set of possibilities (Shulman, 1992). This is a particularly dangerous in ill-structured domains such as medicine, literary criticism, or law (Spiro & Jehng, 1990) and teaching (Shulman, 1992). In examining three ill-structured domains (medicine, literary criticism, and law), Spiro (reported in Shulman, 1992, p. 26) found that instructors who used single case examples "permitted single representations to reign unchallenged." We share Shulman's opinion that teaching truly qualifies as an ill-structured domain, characterized by increasing content complexity and irregularity in applying knowledge across cases (Spiro and Jehng, 1990); thus our emphasis on promoting cases from multiple sites in RCE.

When these cases are transformed into RCE, they acquire an additional attribute that is not possible in the video environment: The cases can be navigated with a highly flexible set of search engines that allow users to find clips that share a common theme or to pinpoint specific incidents or examples encountered in and across the videos. RCE's hypermedia structure guards against this pitfall of prescriptive case use. The six sites serve as multiple teaching cases for students to compare and contrast. Like the use of commentary which Shulman (1992) identifies as a "layer which provides an additional lens to view the events of the case" (p. 12), the video contains the teachers' own commentary on their practice and a researcher-based

interview, and the program provides content-based questions to ponder and research articles to consult. In this way, students are provided supports to use multiple lenses to analyze and critique the cases.

RCE can also be viewed as a window through which students' emerging teaching philosophies are influenced. During pre-service education, preservice teachers define teaching, become aware of and assess their assumptions about teaching, and develop personal philosophies to guide them through their field work, internship experiences, and future teaching positions. Cultural-historical theory views "the development of mind [as] the interweaving of biological development of the human body and the appropriation of the cultural/ideal/material heritage which exists in the present to coordinate people with each other and the physical world" (Cole & Wertsch, 1996, p. 251). That heritage or culture is "the accumulated products of prior generations" (p. 250); for preservice teachers this heritage is likely to be constructed from the co-mingling of many sources — the teaching philosophies of instructors and collaborating teachers, readings and journal articles, reactions to field experiences, recollections of their own experiences as learners. In other words, these preservice teachers are learning and developing through interactions with others, texts, and experiences that both constitute and are constituted by the culture they are adopting as teachers.

One way of thinking about our work with RCE is that we wanted to know whether we could elevate RCE to the level of a "cultural tool" that would be viewed as comparable in importance to the other cultural tools students rely on to shape their thinking about teaching. Our angle into the cultural tool analysis was to examine the impact of RCE on students' reasoning, specifically upon the ways in which they are able to use evidence to support claims about teaching reading. Was RCE integrated into students' own information sources (e.g., books, lectures, observations, recollections) for reflection about teaching and learning? We know that RCE provides access to classrooms in which

a lot of reading instruction is going on (which might otherwise have been closed to many students) and that it allows users to visit, revisit, analyze, critique, compare, and contrast a set of classrooms in a rich, flexible, and idiosyncratic manner. What does this sort of flexibility offer to students? Does it contribute to a restructuring of users' thinking and reasoning activities? Do students consider and even reconsider the content contained in these videos? Does it become part of their "cultural repertoire" that they consider when thinking about and making decisions concerning teaching and learning? Patterns that indicate reliance upon RCE's content as a source of evidence for a particular stance on an issue may indicate a qualitative change in thinking and may provide evidence that this technology *is* becoming enmeshed with the other cultural tools (books, lectures, internship etc.) that mediate these students' thinking.

Methods

Participants

The participants were post-BA (already held a bachelor's degree) students in a teacher education methods course. Thirteen of the twenty-eight students consented to participate in our research project. A majority of participants were Euro-American women. Students had diverse career backgrounds and ranged in age.

RCE training session

In a training session, the first two authors demonstrated RCE after which students practiced using the various functions. We also provided a user manual and made ourselves available through Email and phone to answer questions.

Context of use

Students used RCE as one source from a host of possible sources they were encouraged to draw upon in the course, including (but not limited to) classroom observations, readings, personal experiences, past careers, and video exemplars. Three paper assignments were central to the course, comparing

the use of whole language and skills orientations to teaching reading, management and use of different grouping arrangements (small-group, whole-class and individual instruction), and the awareness and impact of diverse learners on teaching and learning. The second assignment required use of RCE, while RCE's use was optional in the first and third assignment.

Data Collection and Analysis

Data sources. There were a variety of data sources, including three paper assignments, interviews that that focused on reactions to the course, particularly the media component, a follow-up interview in early fall of 1997 focusing on technology learning and current thoughts about RCE in the internship year, video-taped work sessions during which participants worked on the second paper using RCE, using think-aloud method (Afflerbach & Johnston, 1986), and several surveys that provided information about students technology and professional backgrounds and their reactions to the hypermedia. Students participated to varying extents; each decided what combination of paper collection, interviews, surveys, and video-taped working sessions we could use or collect.

Coding rubric. In our analysis for this project, we focused primarily on the three course papers to understand how using RCE impacted participants' use of evidence in their reasoning: Did the use of RCE affect arguments and use of evidence? Was RCE content disregarded? Or did the content play a secondary role to other sources such as books and classroom observations? To assess this, we examined the course papers at a very detailed level. We first read a subset of the papers to gain a sense of the argument structures and flow and to ultimately create a rubric to classify the papers (see Appendix A for coding rubric).

Our coding rubric classifies each statement at a propositional level, identifying claims, questions, evidence, and sources of evidence. We read several papers individually and collaboratively to code statements. We were

careful to code the statements as they fit in the context with other statements. That is, we tried to understand at a contextual level, where multiple sentences could represent one claim or one piece of evidence. We were most interested the structure of and patterns across the arguments presented in the papers. Therefore, we then coded argument chunks, various combinations of claims and evidence, such as Claim-Evidence, Claim-Evidence-Interpretation (see Appendix A for further description of the coding process and codes).

Researchers read a 10% random sample of the papers and coded argument chunks. 91% reliability was reached and discussions resolved any disagreements between scorers.

Results

Since we were interested in the sources that students draw upon when thinking about teaching reading, we focused our data analysis on the three paper assignments and how the students used evidence to support claims about teaching reading. We used the emerging patterns as a starting point to discuss similarities and differences between participants. We then used other data sources as a triangulating device for constructing cases.

Investors

We liken Barbara and Ruth's work with RCE to investors: those who utilize opportunities for future advantage. Investment is seen through their avid and extended use of RCE for each paper assignment. However, the ways in which each utilize RCE for their future advantage differs, as seen through their paper assignments as well as their video-taped Explorer work sessions.

Barbara: Seeking to understand more. Barbara's work with RCE, her papers, and her interviews indicate that she is a preservice candidate who seeks to better understand teaching and student learning. Barbara and Ruth used RCE together in preparation to write their second papers. In preparation, they spent time questioning the teaching and learning that they observed in the video clips. During these moments, Barbara and Ruth seem more involved in the

discussion, indicated by their discourse lacking pauses and containing profuse latching talk, details, and narrative, and the many instances of overlapping talk containing repeated works, such as "yeah" and "ok" (all elements of engagement described in Tannen, 1989). These conversations often became tangential to the course paper assignment on hand. However, in an interview, Barbara identified and highlighted the importance of these discussions, what she termed "blahing":

> Another thing is this whole process of going through this assignment gives the opportunity to, the time spent sitting and watching clips, I just noticed that we had a couple conversations that were like you know, ...talking about the book club, ...things that didn't really have anything to do with the assignment, but it was very, it was just, it was outside of class, but we were still talking about teaching and ideas. I just think that was, especially last year when we are really new to this program and teaching classes, we really needed time to just BLAH about all this stuff that was going on. You know you get all these ideas going on and it's really nice to sit and talk out side of class about whatever comes to mind. (Barbara, 5/97)

Barbara uses RCE as a site to learn more about teaching and learning. In this way, these conversations help her learn more about a topic by asking questions and discussing it with another person, Ruth.

Another way to examine Barbara's views about learning is to examine her use of argument chunks. Barbara balanced claiming, interpreting, and claiming with evidence across all three papers (See Table 1). Use of interpretive thought units (CI or CEI) throughout her papers indicates that Barbara not only used information from her cultural repertoire to make claims, but she also reflected on these topics by interpreting such claims in more depth.

Table 1

Barbara's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	25 %	18 %	25 %
Claim w/ Evidence (CE, CES)	37 %	27 %	49 %
Claim w/ Interpret (CEI, CI)	25 %	45 %	25 %
All Evidence (AE)	0 %	0 %	0 %
Total Argument Chunks	8	11	8
Total No. of Evidence	5	15	8
Number of Video Evidence	3	15	6

Note. See Appendix A for argument chunk descriptions and abbreviations.

This interpretive and reflective stance and willingness to consider other views also becomes clear in Barbara's papers. In her first paper, she indicated that her current understanding of a topic had been changed with use of RCE: "When first thinking about this problem, I had a strong opinion about how to rank the effectiveness of whole-class, small group, and independent work...After viewing several hypermedia clips, however, I have altered my opinion...." (Barbara, Paper 1). Similarly, in her last paper, she also indicated how her views had changed: "...viewing these videos has definitely had an impact on my ideas about teaching reading and writing. At the start of the semester, I was pretty much set on the idea of using only whole language teaching techniques...After seeing the variety of teaching styles in these videos, however, I have come to realize that good teaching comes in many forms...." It appears that RCE provided an opportunity for Barbara to consider new perspectives and learn more about teaching and learning.

Ruth: Affirming what she already knows. While Barbara looks to consider and reconsider issues, Ruth possesses a very different agenda when working with RCE and completing these course paper assignments. Ruth engages with Barbara around many issues that emanate from the video clips they watch. However, Ruth is keenly aware of their primary purpose for using RCE: to gather information for her paper assignment. For example, Ruth identified and

explained this tension between what Barbara calls "Blahing" and Ruth's need to prepare for writing the paper:

> Part of the reason I wanted to jump around; part of the reason I'd go back and see things is because I was just interested in them for their own sake, not because it would help me with the paper. But then we'd do this thing where we'd stop and say what are we doing, we've got to get this thing turned in... (Ruth, 5/97)

It is interesting that Ruth believes that "**we**'d do this thing where **we**'d stop and say what are **we** doing, **we**'ve got to get this thing turned in" (emphasis added) because the video-taped work session indicates that Ruth, alone, identifies that they get off the paper topic and then attempts to reposition their talk. This pattern of interaction became apparent during the video-taped work session. First, Ruth, through action and words, controlled the discussion. She continuously made "move-on" moves, characterized by statements such as "done with this?"; "can we go on?"; "should I go to the search screen?" and mouse actions (changing screens, clicking on new clip choices) which changed the topics of conversations. Often Barbara's discussion or line of inquiry was interrupted by Ruth's actions. Following is a brief excerpt of the work session during which Ruth repositioned the direction of their discussion and work by making several move-on moves.

Barbara Well, I am just trying to think of how, how I would talk about this particular clip cause I, I don't really, I don't see that as part of these 3 categories

Ruth Uh, huh

Barbara except for maybe prior knowledge but, I don't know, not, not really [**Ruth** moves to Search Screen]

Ruth Oh, see I think it is part of the literacy thing. What do you call it? [rustling through papers] liter [**Ruth** peruses search results]

10 **Barbara** literature?

11 **Ruth** Literature. But maybe not, but um, I don't know

12 **Barbara** I think of literature as like books written for [unintelligible]

13 **Ruth** I understand. Would you like to see Book Club then? [clicks on

14 Book Club, Harlem clip to view]

15 **Barbara** I mean for r:e:a:ding instruction. *I don't know* [italicized part,

16 spoken very, very softly]

17 **Ruth** I don't know. To me the easiest way is to just go though these

18 really fast, and if one, I think one of them fits then we'll jot

19 it down. I mean, I don't think we need to sit here and try and

20 force it to fit. [clip starts playing--Book Club, Harlem]

In this excerpt, Ruth made several move-on moves which changed or stopped the direction of the discussion. On line 11, she admitted possible incorrectness in her statement when she said, "but maybe not, um, I don't know". Ruth tended to make these types of statements when she attempted to interpret or extend some issue, often when Barbara began asking her probing questions. When that attempt failed (Barbara continued to explain her point of view), Ruth made another move-on move (Line 13) by explicitly asking if Barbara wanted to see another clip. When Barbara did not answer Ruth, Ruth (Line 17) ended that line of inquiry and began discussing Explorer research tactics while choosing a new clip to play. That new clip moved the discussion to other issues.

Ruth was aware of this tendency to use move-on moves to keep the discussion close to the issues in their course assignment. In an interview, she explained:

> I don't know why Barbara wanted to keep working with me. Because I'd just get impatient and go onto something else when she'd still be looking at something. I guess because we worked on all three of them together, I guess she liked doing it too. Maybe, because we are friends, she didn't feel like

she could say no. No, she wants to really think things through and I just want to say, "I don't know why we are here, let's just move." I don't know why she put up with it but I think on one of the other videos, she had the control (mouse). We took turns. We tried to take turns with control of the mouse. (Ruth, 5/97)

Ruth's cursory awareness of and interest in the issues presented in the videos and discussion may have contributed to affirmation of ideas and beliefs she already held instead of generating thoughtful reflection of new issues in teaching and learning. Table 2 shows Ruth's declining use of claims with interpretation and increasing use of naked claims in her written papers over the semester.

Table 2

Ruth's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	14 %	33 %	60 %
Claim w/ Evidence (CE, CES)	38 %	44 %	40 %
Claim w/ Interpret (CEI, CI)	37 %	11 %	0 %
All Evidence (AE)	0 %	0 %	0 %
Total Argument Chunks	7	9	10
Total No. of Evidence	6	12	15
Number of Video Evidence	3	11	13

Note. See Appendix A for argument chunk descriptions and abbreviations.

In addition to the trends among her argument chunks, comments in Ruth's papers indicate that she seeks to affirm her own beliefs and collect new ideas rather than reflect on and interpret issues of teaching and learning. She explained how the video clips helped her affirm her own perspective, "I'm not sure if viewing these videos has so much changed my perspective as clarified it and supported it. Many of the things I saw touched something inside me that said, 'yes, that's what I believe, that's what I want to do,' but I needed

help formulating those ideas more clearly" (Paper 3), and again, she stated: "Overall I would say that viewing these videos didn't change my overall perspective on teaching reading and writing, but did give me a deeper understanding of what I believe about teaching and learning, how to explain that to others, and what kinds of lessons and environment I can create based on these understandings". Again, the video clips helped her get a sense of what this teaching looks like, "Filling my room with literature was also an idea at the back of my mind which these videos helped to make more concrete."

Compliers

Our complier participants used RCE for the second assignment, which required use of RCE. Even though Nina and Jack did not use RCE as avidly as the Investors, these compliers gained benefits from using RCE.

Nina: Seeking information to fill in the gaps in her knowledge of teaching reading. Nina uses RCE to help her learn more about teaching reading, filling in the gaps created by a lack of opportunity to learn from her collaborating teacher. Nina explained in her third paper:

> By viewing the hypermedia, I have increased my knowledge on various methods of teaching reading and writing. It was an especially beneficial experience for me because of the little reading that I am able to observe in my CT's classroom. I believe viewing the teachers on hypermedia has made me more aware of the many methods to teach reading and writing.

Thus, with use of RCE, Nina gains valuable information about teaching reading, unavailable in other contexts.

Nina was also interpretive and reflective in her papers (see Table 3). Her Naked Claim proportion decreased, she maintained her Interpretive proportion throughout, and the number of evidence used to support claims increased. Over time, she used more evidence and interpretation to accompany her claims.

Table 3

Nina's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claim (AC, CS)	50 %	24 %	29 %
Claim w/ Evidence (CE, CES)	19 %	28 %	36 %
Claim w/ Interpret (CEI, CI)	19 %	28 %	21 %
All Evidence (AE)	12 %	8 %	7 %
Total Argument Chunks	16	25	14
Total No. of Evidence	9	13	12
Number of Video Evidence	6	10	10

Note. See Appendix A for argument chunk descriptions and abbreviations.

Nina's videotaped RCE work session supports her interpretive stance. After watching clips, Nina interpreted the content. For example, after viewing a San Antonio, Texas clip in which students read different texts, Nina said, "Students feel successful. Choice is important." Nina took the time to puzzle over issues that she found intriguing and took steps to analyze video clip content. Nina used RCE to help her fill in the gaps.

Jack: Affirming his views on teaching or a case of missed opportunities?

Jack's first and third papers had a large proportion of Naked Claims (see Table 4). His tendency to make claims about teaching may suggest that he is using RCE to affirm his views of teaching rather than interpret and examine methods of teaching. However, in his second paper when he used RCE, he uses more evidence, alone and to support claims, and fewer Naked Claims.

Table 4

Jack's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claim (AC, CS)	71 %	33 %	67 %
Claim w/ Evidence (CE, CES)	0 %	13 %	22 %
Claim w/ Interpret (CEI, CI)	29 %	27 %	11 %
All Evidence (AE)	0 %	27 %	0 %

Total Argument Chunks	9	14	15
Total No. of Evidence	0	9	6
Number of Video Evidence	0	9	5

Note. See Appendix A for argument chunk descriptions and abbreviations.

Jack's videotaped RCE work session provided insight into Jack's use of RCE. In Jack's papers, he summarized clips (often nearly verbatim) to support his thesis. In the video-taped work session, we expected to see Jack summarizing clip content. We were surprised when we saw Jack asking "interpretive" questions, commenting about clips, and even reading the probing question-section in RCE. For example, in his work session, Jack said: "I don't think the reasons she gives are very powerful" (In response to clip on Integrating Process and Content); "It doesn't seem like the same classroom-- goes from pre-reading to Great Books"; "Interesting, how *do* they get kids to read at home?"; "I wonder why children wouldn't be cognizant that they're going to be judged on spelling at the end and so fall into the same trap." These interpretive questions and comments did not appear in his papers, nor were they answered in his video-taped work session. We suggest that Jack may be a case of a "missed opportunity"; if he had worked with a partner, he might have turned those budding reflections into more substantive and dialogical inquiries.

Jack's fall interview further illustrated his regard for the RCE content and showed that he hoped for the opportunity to use RCE as a practicing teacher. He explained:

> ...So it would be neat to be able to watch those videos, those clips, a year later when I'm in the classroom or when I have a question about something that was talked about in those classes, say oh, what did they say on that. (Jack, 9/97)

Jack pushed us to think about the role of collaboration and RCE. Discussion may help preservice teachers benefit from this technology.

Resisters

Our "resister" participants *resisted* using RCE even for their assignment which required use of RCE. In some cases, the resistance was due to lack of technology experience. In other cases we could not identify the source underlying resistance, but participants simply chose not to use RCE.

Stella: Surface level reporter. Overall, Stella's papers were of low quality because they consisted primarily of "reporting" evidence, as seen in her prominent use of All Evidence argument chunks, and often lacked interpretation and coherence (see Table 5).

Table 5

Stella's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claim (AC, CS)	22 %	29 %	53 %
Claim w/ Evidence (CE, CES)	56 %	46 %	13 %
Claim w/ Interpret (CEI, CI)	0 %	0 %	13 %
All Evidence (AE)	11 %	21 %	20 %
Total Argument Chunks	7	16	12
Total No. of Evidence	6	10	14
Number of Video Evidence	1	8	13

Note. See Appendix A for argument chunk descriptions and abbreviations.

We liken Stella to a surface level reporter because her comments about the classrooms she viewed are transparent, or surface level, observations. In the following excerpt, note that she had not used RCE but had watched the full-length video in class, as indicated by her survey after completing the first assignment. She wrote:

> In one of the video clips we watched, the teacher led a small group of students in a group discussion/problem. These were very young students who probably would have trouble working in groups. The teacher got the students

excited and anxious to answer questions and discuss the problem. I was quite impressed. I believe group work should start young.

We saw this reporting of evidence in her second paper as well. Often the evidence she reported was dangling, in the sense that it was not tied contextually to any bounding idea or theme. She wrote:

> On a more personal note, my nieces have attended a private school which emphasizes skill-based learning, especially phonics and spelling. They recently switched to the public school which uses whole language learning. They are so advanced in their reading and spelling it amazes me. My sister, their mother, teaches fourth grade. She believes that the structure they were receiving before, as far as spelling and phonics goes, has been erased. This teacher has taken whole language to the extreme. I am not criticizing the program. I simply thought it was something to think about.

In addition, we were struck by the serial nature of her reporting; she did not use a cross-classroom lens. She wrote her papers in the same fashion as she had watched the videos; she recounted evidence in her paper serially. In her third paper, she demonstrated this serial stance and her continued manner of hitting on surface issues. She wrote, "The first classroom I visited was Danville. I noticed that she spoke very slowly...The next classroom I visited was Harlem. I loved this teacher."

We wonder if Stella's arguments would have been more pointed and her evidence more vivid and tied to claims if she had used RCE. Possibly, having a partner or having class time to use RCE would have helped Stella become invested in the technology.

<u>Ed: Technology background contributing to missed educative opportunities?</u>

Ed, although he attempted, never successfully used RCE for his course assignments. He explained to us:

> I did go in and try to use the disk. And I wasn't terribly successful with it. I went in to use it and [laugh], like I said, never used it before, and

> I didn't get the cartridge or tray to .. it got stuck in one of the computers. I went back and had one of the lab monitors to help me. I had trouble with this. I tried to use the disk two times. The first time after I got it stuck in the machine, I was more successful than the second time. (Ed, 5/97)

Even though he was not successful using RCE, Ed watched the videos in class. As you can see in Table 6, after his first paper, Ed used all video evidence in his papers. Further, over the semester Ed increasingly made claims with interpretation. This pattern of argument chunks indicate that Ed is thinking and reflecting on the teaching and learning going on in the videos. However, different than Barbara or Ruth but similar to Stella, is his serial approach to analysis and use of evidence.

Table 6

Ed's Argument Chunks & Evidence Across Papers

Argument Chunks	Paper 1	Paper 2	Paper 3
Naked Claims (AC, CS)	29 %	38 %	42 %
Claim w/ Evidence (CE, CES)	43 %	19 %	16 %
Claim w/ Interpret (CEI, CI)	14 %	25 %	34 %
All Evidence (AE)	14 %	6 %	0 %
Total Argument Chunks	7	16	12
Total No. of Evidence	6	8	5
Number of Video Evidence	1	8	5

Note. See Appendix A for argument chunk descriptions and abbreviations.

Ed's arguments remain at a school-by-school level instead of a cross-school analysis and evidence. For example, he made a claim about the school in Harlem and used Harlem evidence. In the next paragraph, Ed made a claim about the Danville classroom with Danville evidence. Yet, Ed did not interpret or reflect across issues he identified in individual schools. We question whether use of RCE might have sharpened his arguments and broadened his claims to

involve more cross-school analysis. If so, by *not* using RCE Ed may have missed an educative opportunity.

Ed learned from watching videos, yet how would his arguments have changed if he had been able to look more pointedly and specifically within hypermedia system? In an interview, he explained that the CD made him try to think across schools:

> I realized that all these videos were contained on the CD-ROM and that they formed some sort of a sort of a whole. They were all part of some sort of entity in the classroom. I think that made me think more about the different videos and try to find points of similarity between them or differences. I think the fact that I knew that they were out there on this CD-ROM added to that. I think that made me think more about the relationship between all these different classes. (Ed, 5/97)

Yet, if Ed did think and reflect across schools, it did not appear in his written work. Unfortunately, without Ed using RCE to a greater extent, we are unable to ascertain the possibilities of RCE's effect on Ed's argument structures and beliefs about teaching and learning.

Conclusion and Further Research

RCE, which provided vivid images of teachers teaching reading to diverse students, is a tool developed with the intent of influencing preservice teachers' thinking. Pea (1985) has argued that "the cognitive technologies we invent can serve as instruments of cultural redefinition (shaping who we are by changing what we do)" (p. 168). Pea rests his argument on the fact that the technological tools not only amplify human mental powers (e.g., reduce time for some processes which provides more time for other mental thought) but also that "cognitive tools can yield orders of magnitude and thereby qualitative changes in forms of thought" (p. 169). Our study indicates that preservice teachers use the cases in RCE as an information resource, much like books they read, lectures they hear in courses, or observations they make. We observed

RCE helping students to consider these exemplary cases rather than taking them as prescriptions. One pointed example is how many students rejected the practice of the Media, Pennsylvania teacher because they felt the teaching was too phonics-based. However, after using RCE to pointedly compare cases, these same students grew to appreciate the complexity of the Media teacher's approach and the enormous library and reading emphasis in the school; they even likened elements of her practice to that of other teachers in RCE.

The next questions may be: To what extent does RCE redefine culture? To what extent does this tool become enmeshed as part of these teachers' perceptions of their communities of practice (i.e., their cultural world)? Specifically, does the use of the tool transform these teachers to an extent that these teachers may, in turn, impact the larger "cultural world"?

One way we might assess such a qualitative change is to examine the extent to which teachers who use RCE impact the teaching culture within which they work. For example, by following preservice teachers from their exposure to RCE through their internship to their teaching positions, we may better understand the extent to which they have internalized various instructional practices and perspectives common in RCE. In addition, observing the manner in which such teachers function as "collaborating teachers" (in the future) would also inform us to possible recursive impact on the culture. However, as Sykes and Bird (1992) suggest, even after exploring cases and becoming reform-minded, if new teachers find themselves in a setting that does not support such reform practices, change may be unlikely. These inquiries, obviously, will require longitudinal studies.

At this point in time, our past research and the current study (i.e., Jack's and Ed's missed opportunities to discuss insightful observations of video content and Barbara and Ruth's numerous "BLAH" moments) have led us to question if RCE benefits users most when used collaboratively toward a course goal. We are currently analyzing data from another course which incorporated

RCE into the course goals. Students worked in pairs and used RCE to define a question and construct a multimedia "paper" in the RCE Notebook. Our continuing research will help us to better develop cutting edge technologies in teacher education and try to understand these technologies' effect on learning and teaching.

Appendix A: Classification Scheme

I. Classifying Statements

Statements
1. Claim
2. Hedged Claim
3. Interpretation - Inference
4. Summary or Synthesis
5. Question

Evidence
1. None
2. General
3. Specific

Source of Evidence
1. Personal/CT
2. Video
3. Book
4. Class
5. Other

II. Classifying Arguments

A. Naked Claims
All Claims (AC); Claim-Summary (CS)

I would argue that the primary organization strategy in the classroom should be small group. The drawback to this strategy is that it requires the teacher to make the biggest investment "up-front," and it is probably the strategy that the teacher is least used to using. Under this strategy, the teacher must work with the students in the beginning to establish a set of ground rules, responsibilities, and expectations in order to guide the students in their endeavors. (Jack, AC, Paper 1)

B. Claim with Evidence
Claim-Evidence (CE); Claim-Evidence-Summary (CES)

The teacher in the Hawaii classroom accessed students' previous experiences with caterpillars to assist in a guided reading exercise. Students wrote in their journals about what they knew about caterpillars before reading a book about a boy who learned about caterpillars. (Jessie & Nina, CE, Paper 2)

C. Claim with Interpretation
Claim-Evidence-Interpretation (CEI); Claim-Interpretation (CI)

In addition, this teacher uses literature to teach skill instruction. For example, in the video she is shown teaching story grammar during a writing lesson. The students write a story based on a story that she has read to them, and as they write she points out the need to incorporate characters, setting, conflict, and a solution in their story. In the voice-over, she explains that she knew the students needed and were ready for this lesson based on the types of stories they had been writing, stories that had characters but no apparent plot. This is a fascinating way of typing literature to skill instruction, because the emphasis is on helping students express themselves more effectively, not simply on learning skills. (Barbara, CEI, Paper 2)

D. All Evidence (AE)

The next classroom I visited was Danville where the students were performing prereading. She would review the long /e/ sound, using words that appeared in the story they were reading. She then extended the lesson to include word endings. She would hold up a piece of paper with the word "bee" on it. After the kids were familiar with the word, she would extend the paper to read "bees." // This classroom appeared to be rich in literature. (Stella, AE, Paper 2)

III. Reliability
91% Inter-rater reliability

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